2003
NASSAU COUNTY
MOSQUITO SURVEILLANCE AND CONTROL REPORT

ACKNOWLEDGEMENTS

The following departments and agencies participated in mosquito control activities.

- Nassau County Department of Public Works (DPW) provides equipment and personnel for mosquito control, surveillance, and water management maintenance.

- Nassau County Department of Health (NCDH), Division of Environmental Health, provides personnel for mosquito and bird surveillance, mosquito trapping, complaint response, monitoring, control, data compilation and communications.

- Nassau County Department of Health, Division of Disease Control, works with health care providers to assure suspect West Nile Virus (WNV) cases are reported and appropriate diagnostic tests are done.

- Nassau County Department of Health, Division of Public Health Laboratories, identifies (speciates) mosquitoes captured in gravid, Faye-Prince, and CDC light traps. Stores "pools" of mosquito specimens. Ships mosquito pools and birds to the NYS Department of Health lab for viral testing

- New York State Department of Health (NYSDOH) tests mosquitoes for arboviruses by screening for arboviral agents using polymerase chain reaction protocols. Mosquito pools from Nassau County are tested for Eastern Equine Encephalitis (EEE) and West Nile Encephalitis (WNV), as well as other mosquito-borne diseases.

- NYS Department of Environmental Conservation (DEC), Office of Wildlife Pathologist, examines the birds sent to Wadsworth Center Labs for evidence of WNV.

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Introduction

The Nassau County Department of Health (NCDH) and the Nassau County Department of Public Works (DPW) work together to suppress mosquito populations through mosquito surveillance and control. Both departments are committed to utilizing Integrated Pest Management (IPM), which is a systematic approach to managing pests that focuses on long-term suppression or prevention, with a minimal impact on health, environment, and non-target organisms.

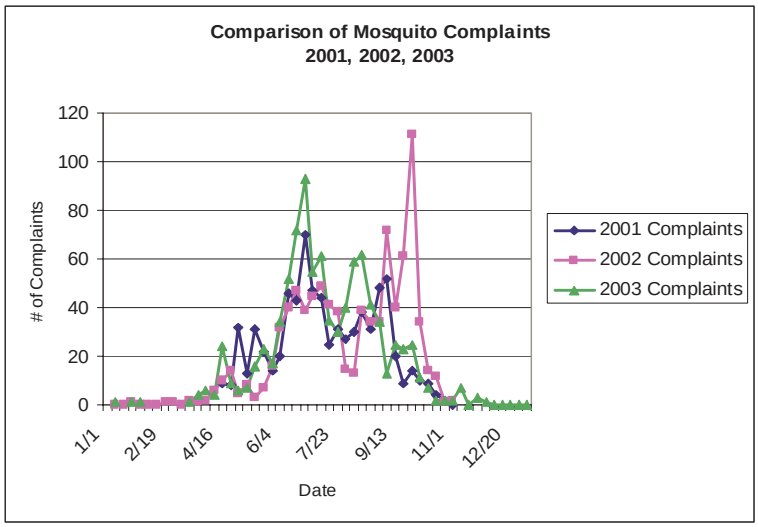
In 1999, an outbreak of West Nile Virus *(WNV), a mosquito–borne disease that was previously unknown in the western hemisphere, occurred in New York City and on Long Island. There was unprecedented concern by the public after a number of residents contracted WNV and several died in New York City and Nassau County. Fortunately, Nassau County had a mosquito program already in place to competently handle the situation. With the help and expertise provided by the New York State Health Department and the Centers for Disease Control, Nassau County was able to effectively respond to all aspects of the WNV threat.

NCDH and DPW receive many calls from County residents concerning mosquitoes every year. Since receiving more than 100,000 complaints and inquiries in response to the unprecedented introduction of West Nile Virus to the New York City/Long Island area in 1999, the annual combined number of complaints and inquiries has generally decreased (9,912 in 2003). Although some of the overall reduction can be traced to less media attention to WNV, the efforts of both departments dedicated to public health and conducting a viable mosquito program, as well as the implementation of IPM principles, have reduced mosquito populations contributing to these lower numbers.

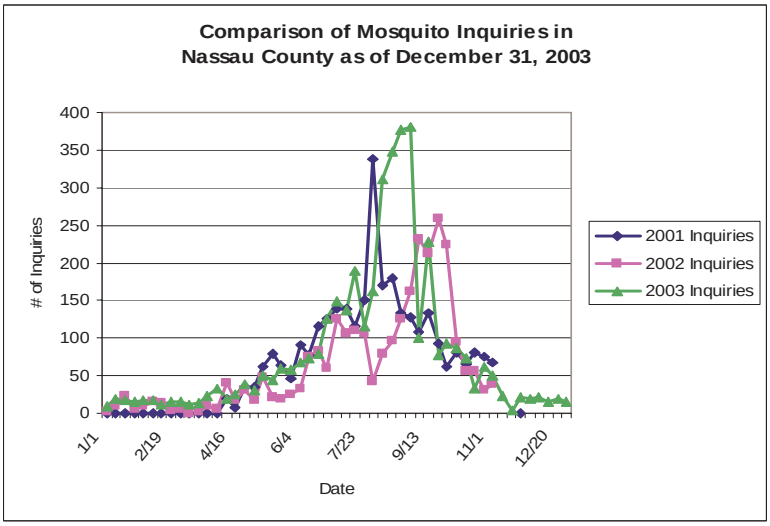
In addition to mosquito related complaints, NCDH also receives and records reports of dead birds in the County (birds are known to be a reservoir for WNV). In 2003, there were 1,261 reports.

*WNV symptoms usually occur 5 – 15 days after the bite. Most people have no symptoms or may experience only slight fever or headache, resulting in many cases of WNV never being diagnosed. Severe infections, which usually occur in persons over the age of 55, may result in encephalitis with high fever, headache, confusion, muscle aches, and weakness, seizures, or paralysis. There is no specific treatment for WNV. Supportive care is provided until symptoms subside. Since the first case of WNV in 1999 there have been a total of 37 cases of WNV found in Nassau County. Seventeen were diagnosed in 2003. (For routes of transmission see Figure 15)

The following graphs reflect the influx and distribution of complaints, inquiries and bird reports in 2001, 2002, and 2003.

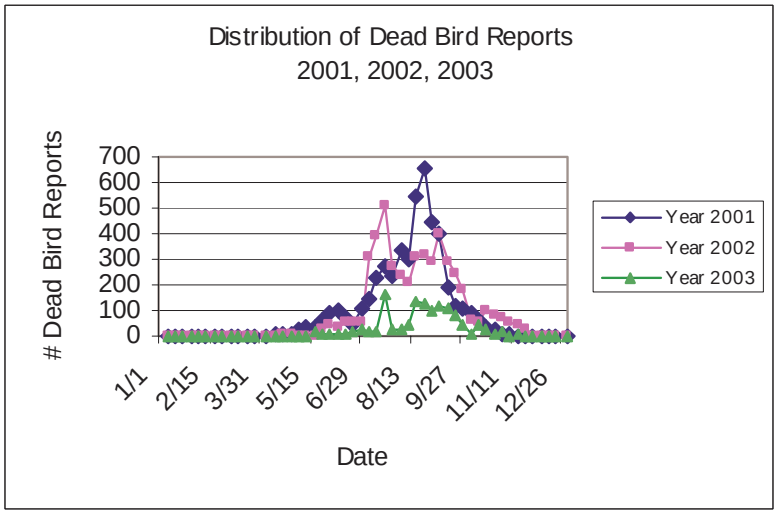


Graph 1



Graph 2

Note – Complaints are defined as situations which required a field visit, inquiries are those that could be handled by phone or letter



Graph 3

Background

Mosquito control began in Nassau County in 1915 as a response to mosquito-borne malaria outbreaks. Kerosene or #2 oil were used to coat bodies of water suspected of breeding mosquitoes, suffocating the mosquito larvae, thus reducing the overall mosquito population. This practice was continued until 1920, at which time the malaria threat was brought under control.

The application of oil on standing water, continued for purposes of nuisance control. In 1929, the first Mosquito Commission was formed in Nassau County. The Commission was comprised of village mayors and officials, businessmen, and other residents from the community. They introduced the concept of ditching to provide effective drainage of the salt marshes, thus removing many of the conditions conducive to breeding mosquitoes. Ditches were dug by hand and, in some cases, dynamite was used to quickly remove soil, vegetation and sand.

In 1948, the Nassau County Mosquito Commission was placed under the direction of the Department of Public Works (DPW). Under new consolidated direction, improvements were made to the antiquated mosquito control techniques. Mechanization of ditching procedures, the use of spray trucks, and introduction of new mosquito control products helped to control the mosquito population.

Figure 1

Back in the 1950's and 60's mosquito control relied on spraying oils on standing water.

In 1970, a surveillance program to assess mosquito populations was begun by placing mosquito traps at 8 sites across the County

In 1996, NCDH and DPW were directed to work together to establish a new mosquito control program. Both departments transferred personnel into the program, and equipment was purchased for ditch rehabilitation, surveillance activities, control tactics, etc. With the addition of the Health Department to the Mosquito Surveillance and Control Program, the Board of Health implemented a new pest control concept called Integrated Pest Management (IPM), which had just been initiated in County-owned buildings. IPM is a system which seeks to control pests, including mosquitoes, by non-chemical means whenever possible, incorporating all reasonable measures to prevent pest problems by properly identifying pests, monitoring population dynamics, and utilizing cultural, physical, biological, or chemical control methods to reduce pest populations to acceptable levels.

Pesticides would only be used if other methods of control failed and the potential risk of not controlling the mosquitoes outweighed the risk of disease or nuisance they might cause. If that occurred, then the least toxic mosquito control product to humans and non-target organisms would be used.

In 1999, with the outbreak of WNV, Nassau County expanded its Mosquito Control Program using IPM principals. This resulted in the addition, increase, or expansion of: the number and types of mosquito traps deployed, mosquito surveillance activities, mosquito identification, mosquito shipping and handling, weekly mosquito update reports, interaction with media regarding mosquitoes, and mosquito complaint response.

The additional work required an increase in the number of personnel dedicated to the Mosquito Surveillance and Control Program, as well as their appropriate training and certification to perform tasks such as mosquito identification and the application of mosquito control products.

Mosquito Habitat

Mosquitoes have four distinct stages in their life history; the egg, larvae, pupae and adult. The larvae, also known as “wrigglers” and the pupae, sometimes called “tumblers,” are found in water. Although the larvae live and get their food in the water they must come to the surface for air or obtain air from the underwater portions of aquatic plants. Mosquitoes have adapted to most kinds of aquatic habitats except running water and the open water of lakes, seas, and oceans. Different species of mosquitoes prefer certain types of aquatic habitat, and can be categorized based on this preference. The four types of habitat are; permanent pools, transient water, floodwater, and artificial container and tree holes. Mosquitoes preferring permanent pools are generally found in fresh bodies of quiet water. Typical habitats are shallow marginal ponds, lakes, and smaller impoundments, the main characteristic being a degree of permanency. Transient water types are generally associated with waters found in street storm drains, roadside ditches, clogged streams and puddles. Floodwater species of mosquitoes prefer areas that are intermittently inundated with water. Tidal marshes on the County’s north and south shores provide extensive areas of floodwater habitat.

The final category is composed of mosquitoes that favor artificial containers and tree holes. This type of habitat is extremely common in all residential areas of the County. Swimming pools, bird baths, rain gutters, old tires, pails, cans, children’s toys, or any object that can collect and hold water may serve as a breeding site.

Figure 2
Children's toys can hold water and breed mosquitoes

Figure 3
Ornamental and fish ponds may breed mosquitoes

Seasonal Duration and Weather

Mosquitoes may be active from March until freezing weather. Nassau County's mosquito program operates throughout the year, however the busiest time is from May through October. In 2003, mosquito larvae were found as late as the middle of November. Mosquitoes sometimes over-winter as adults in residential homes, street drains and other warm and moist places, emerging on mild days. Storms from April through October are a major factor leading to mosquito breeding, as well as higher than normal tides which affect the egg hatching of the salt marsh mosquito. The accumulations of water, with the presence of organic matter in any container, depression, object, etc., for as little as four days, or as in most cases 1-2 weeks, can serve as a breeding site for mosquitoes. Therefore, rainfall plays an important part in the reproductive cycle of the mosquito (see Figure 4). Air temperatures are also a factor, as colder temperatures decrease mosquito activity.

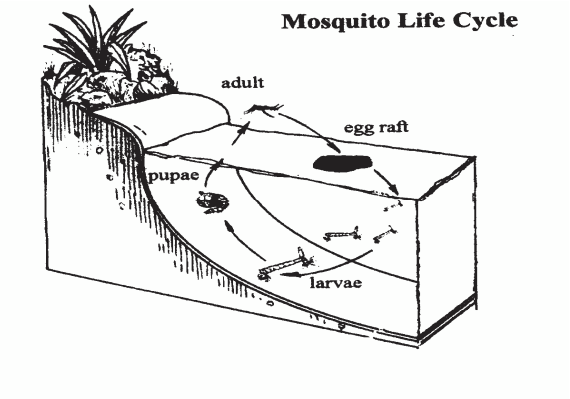


Figure 4

Mosquito Surveillance

Surveillance of the larval and adult stages of the mosquito is an integral part of any effective program. Two methods of monitoring actual and/or potential mosquito populations are "dipping" for larvae, and "trapping" adult mosquitoes with CDC light traps, New Jersey light traps, Faye-Prince traps, and Gravid traps.

Dipping for Mosquito Larvae

The most effective means of controlling mosquito populations is to identify breeding sites so that they can be modified to prevent standing water conditions conducive to mosquito breeding and/or treated to kill the larvae before they become flying, biting adult mosquitoes.

"Dipping" for larvae is the sampling technique used to estimate the number of larvae present in the standing water. If the number of larvae is excessive, the habitat may be modified or an appropriate larvicide applied. All treatments are made in compliance with the product labels and permits obtained from New York State Department of Environmental Conservation (NYSDEC). The information gained from these larval dipping surveys allows us to determine if control measures are necessary and, if so, what measures to take. NCDH's Integrated Pest Management Program (IPM) dictates that we do not apply pest control products indiscriminately; therefore, dipping plays an important role in minimizing the use of pesticides. When necessary, treatment (larviciding) can be applied by hand to specific breeding locations or by helicopter over larger and less accessible areas.

Figure 5

Figure 5A

A "dipper" consists of a long pole with a cup on the end. The inspector dips the cup into the standing water and then views what is captured in the cup. The picture on the next page shows the contents of a dipper.

Mosquito larvae (approximately ¼ inch long)
Figure 6

This dipper cup has larvae and debris that has been scooped from the standing water. The larvae are counted and possibly speciated, to provide the inspector with information which enables him/her to determine proper treatment, and/or type of mosquito that is breeding in the body of water.

Trapping Mosquitoes

Mosquito trapping, using four different methods, is done for the following purposes:

1. Estimate the Countywide adult mosquito population at a given time
2. Identify specific areas with high mosquito populations
3. Identify genus and species of mosquitoes
4. Test for disease, especially West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE).
5. Assess effectiveness of control efforts.

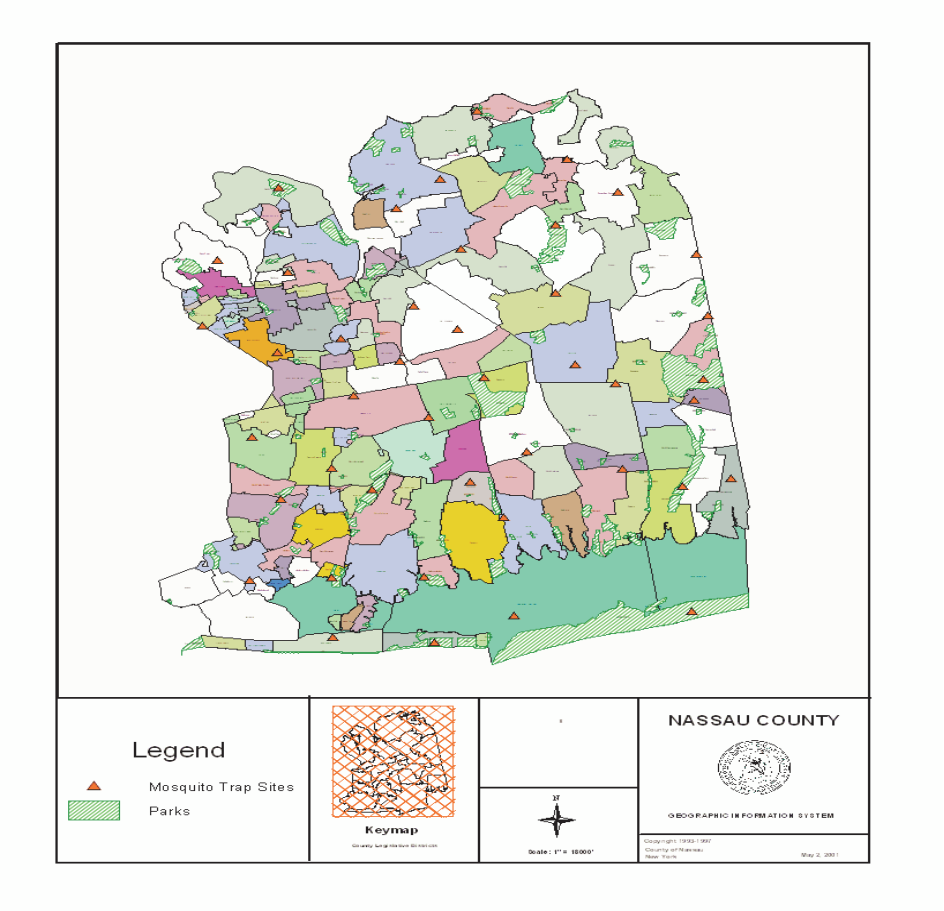
If the number of adult mosquitoes is unacceptable, an appropriate control measure may be recommended, as well as a closer look at breeding areas in the vicinity.

Figure 7
Mosquito sorting and identification at the Nassau County Health Department Laboratory.

CDC Light Traps

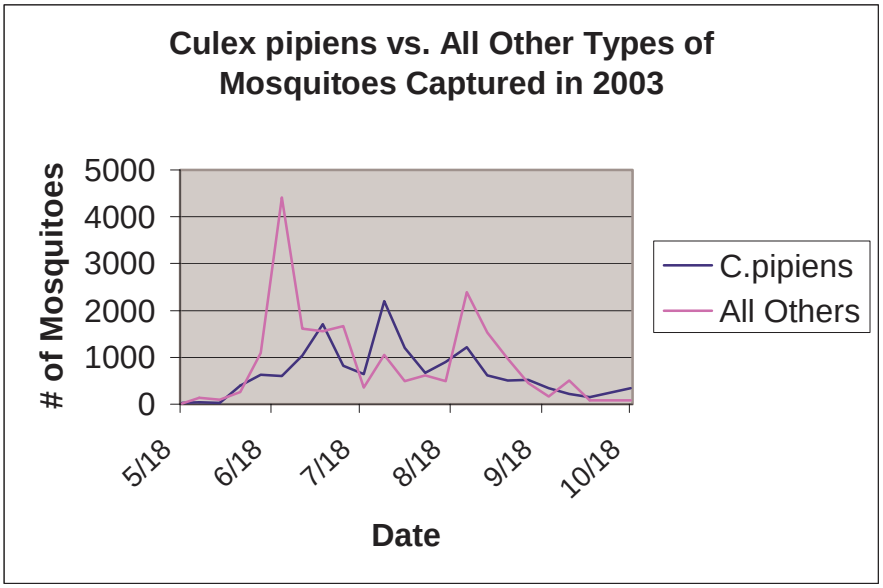
CDC light traps use a combination of light and carbon dioxide (from the sublimation of dry ice) to attract mosquitoes. There are currently 42 CDC traps situated strategically throughout the County, although auxiliary sites may be added at times to assess special situations (see p. 9).

Figure 8
CDC Light Trap and dry with dry ice attractant



Map 1

Above is a map of Nassau County indicating a network of CDC Light Traps



Graph 4

The graph above depicts the mosquito season in Nassau County; it begins in May and continues into October. *Culex pipiens*, the major transmitter of WNV, generally followed the trends shown by other species of mosquitoes, which also depend on standing water and warm temperatures to breed. The numbers of mosquitoes on this graph represent those that were captured in CDC Light Traps at 42 sites geographically located at approximately 2.5 mile intervals throughout the

County. In 2003 the CDC light traps were operated 703 times capturing 31,113 mosquitoes. The season's trapnight average for all 42 sites was 44.3 mosquitoes/night with a range of seasonal trap night averages from 2.8 to 393.3 mosquitoes/night. At times additional traps may be added to the network to help evaluate certain situations. (see table 2 for details)

Gravid Traps

Gravid traps are another type of trap used to capture mosquitoes (especially *Culex*.) A female mosquito is considered to be gravid when she is heavy with eggs. Generally a blood meal is required to provide the nourishment necessary to develop her eggs, which then can be deposited. Gravid mosquitoes (*Culex*) are considered to have a higher probability of carrying disease because they are more likely to have taken a blood meal.

Figure 9
The gravid trap imitates the stagnant water scenario the mosquito instinctively seeks out to lay her eggs.

The gravid trap consists of a tray containing standing water with the high organic content necessary to nourish mosquito larvae once they emerge from their eggs. Just above the water level in the tray is a cylinder with a battery-driven fan inside. The fan sucks the mosquitoes into the collection bag above when they fly in to deposit their eggs on the putrid water. In 2003, 95 gravid traps were run, trapping 3,612 mosquitoes.

Faye – Prince Traps

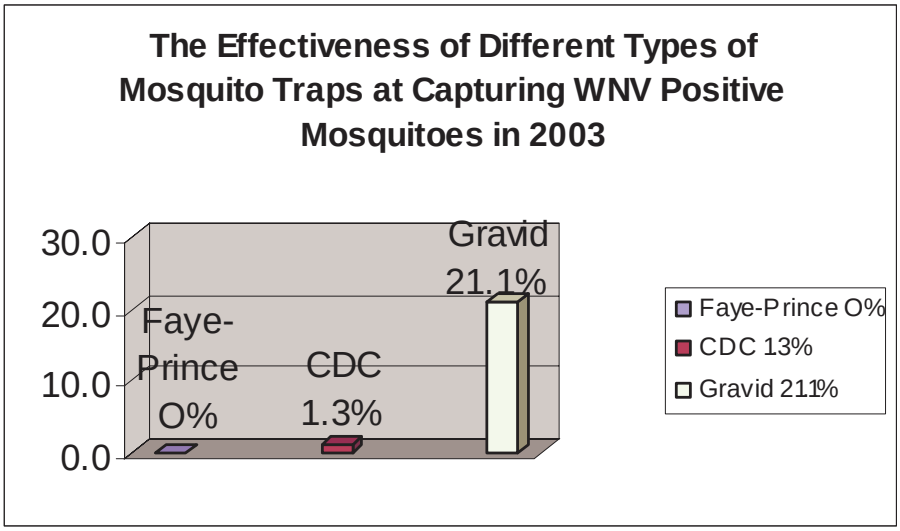
Figure 10
Faye-Prince Trap

Faye-Prince Traps use only carbon dioxide as an attractant. These traps most likely capture mosquitoes which are active day time biters, versus the night time biters such as Culex pipiens. The trap design is based upon the attractiveness of contrasting gloss black and white panels and employs a wind orienting cover.

Refer to Table 3 for details regarding females of all mosquito species captured using these trap methods.

Positive Mosquito Pools

After trapping, the mosquitoes are delivered to the Nassau County Department of Health (NCDH) Laboratory for identification and enumeration. The mosquitoes are then sorted into groups or "pools" by species and type and shipped to the New York State Department of Health (NYSDOH) Laboratory for viral testing. Of the 596 "pools" sent to the NYSDOH Laboratory in 2003, 29 were reported as positive for West Nile Virus.



Graph 5

The graph above represents the effectiveness of the previously described mosquito traps at capturing positive mosquitoes in 2003. All 29 of the positive mosquito pools were Culex pipiens. Ninety five Gravid Traps were set and 20 of the pools captured were positive. Seven hundred and three CDC traps were set and 9 of those pools were positive. Faye-Prince Traps were only operated 12 times. They did not capture any positive mosquitoes, and any determination regarding their effectiveness is inconclusive due to insufficient data. Refer to Table 4 for details.

New Jersey Light Traps

New Jersey light traps attract mosquitoes solely by light, and are suitable for monitoring the large numbers of salt marsh mosquitoes found on the shores of Nassau County. A limitation of this type trap is the need to have an electrical outlet, since they are not battery operated as are the CDC Traps. NJ Traps also tend to damage the mosquito specimens, which makes identification very difficult. Therefore NJ Traps are used solely to estimate mosquito populations without particular attention to the species. New Jersey light traps were located at the following sites:

The High Hill Area of Jones Beach
State Houses @ Jones Beach
Jones Beach Sewage Treatment Plant
Inwood Country Club
Cold Spring Harbor Fish Hatchery
Lido Beach, adjacent to water tower
Cedar Creek Sewage Treatment Plant, Wantagh

Figure 11
New Jersey Mosquito Trap

The New Jersey light traps were operated from May to October in 2003. They generally showed light adult presence (< 50 mosquitoes per trap per night.) The highest counts were at the Jones Beach trap sites.

Other Surveillance

Boat Surveys

There are more than 100 bodies of land in the south shore bays of Nassau County (hassocks, meadows, marshes, fields, islands, etc.) Most of these are underwater at high tide and so are unsuitable for mosquito breeding. The few islets that do remain wholly or partially above a typical high tide, and thus are capable of supporting breeding pools of *Ochlerotatus sollicitans* and other salt marsh mosquitoes, were monitored periodically by boat.

Figure 12
Mosquito Inspectors launching survey boat

Figure 13
Mosquito Inspectors under way to survey hassocks

Salt Marsh Surveys

Salt marsh areas, especially on the south shore of Nassau County, are potential breeding sites for mosquitoes. High tides, storm water, or heavy rains can cause areas not normally covered by daily tidal activity to flood, hatching mosquito eggs within minutes of contact with the water. Therefore, every Monday during mosquito season, the marsh areas are surveyed and larvicide is applied where necessary.

Upland Surveys

In addition to the salt marsh surveys, many upland surveys of streams, drains, ponds and freshwater marshes were made to determine mosquito breeding potential and, especially, to determine suitability of these sites as breeding areas for *Culiseta melanura* and *Culex pipiens* mosquitoes which are involved in the bird-to-bird/human transmission of EEE and WNV.

Storm Water Recharge Basin Surveys

Storm water recharge basins (SWB's), commonly called sumps, are designed to return surface runoff water to the ground water table. There are approximately 780 sumps in Nassau County: 580 sumps are managed by Nassau County, the rest are managed by local municipalities. Sometimes, they retain sufficient water to become major sources of mosquitoes. In 2003, 648 sumps were surveyed, finding mosquito larvae on 89 occasions (including reinspections). Larvicides were used in most cases to kill the larvae.

Figure 14
This storm water recharge basin (swb), also known as a sump, holds water all year long. It has also become a dumping ground for old tires, which can also collect water and serve as breeding sites for mosquitoes

Dead Bird Reports and Testing

Birds have been implicated as the reservoir or source of WNV. When a mosquito bites a bird infected with WNV, the mosquito may then spread the virus to another bird, other animal or human. Apparently, the American Crow is quite sensitive to WNV. Although most birds are only sick for a few days and fully recover with immunity to new infection, crows are more likely to die from the disease. Therefore, part of the response plan is to record information about dead birds, especially crows, and in some cases (determined by the NYS Lab quotas) have them tested for WNV. In 2003, 1261 dead birds were reported, 37 were sent to the lab, and 22 were WNV positive.

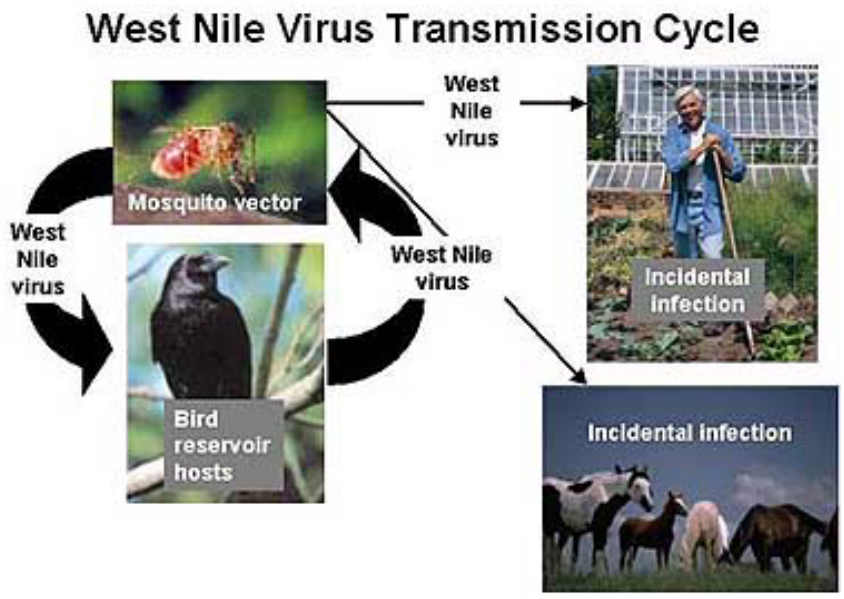
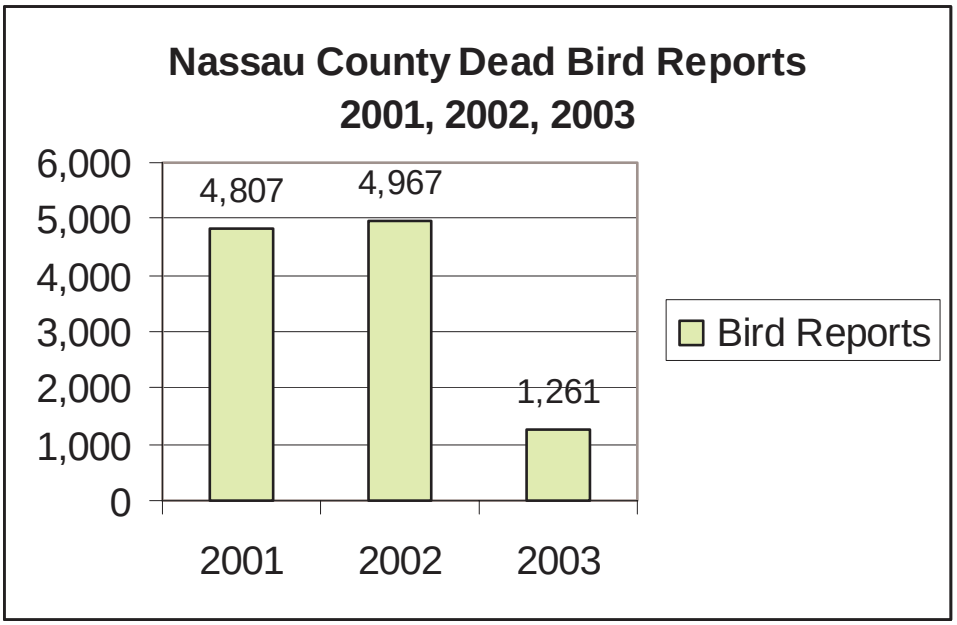


Figure 15



Graph 6

The graph above compares the number of bird reports received over the last three years

Complaints/Service Requests and Inquiries

In 2003, 4,912 complaints/inquiries were received in response to the WNV threat. All complaints, whether received by telephone, email, letter, or referral within the county system, were entered in a log and assigned for inspection. Inspection generally involved a visit to the complainant's home, inspection of a specific situation or, more often a neighborhood survey. Surveys included, but were not limited to, streams, ponds, marshes, drainage ditches, standing water, swimming pools, artificial containers, street drains and nearby storm water recharge basins. Property owners were apprised of conditions when present. Otherwise, visit notices and mosquito information pamphlets were left. If appropriate, treatment was made by hand with a suitable larvicide. If a major breeding area was identified, follow-up inspections were made in one to two weeks. Inspection results and control efforts were then entered in the complaint log after review by the supervisor and prior to filing. Inquiries were defined as those situations which were handled by phone or letter. For example, if a resident called and requested information about mosquito breeding, a Health Department Inspector would educate the person and possibly send the Nassau County Mosquito Pamphlet, which provides much useful information.

Control Activities

As stated previously, Nassau County is committed to applying the principles of IPM to all its pest control activities. What this means in practical terms is that the cornerstone of our control strategy is surveillance, so that control strategies are based on reliable information and then monitored for the effectiveness of that strategy. In some situations no treatment is necessary (for example, there may be mosquito-eating fish or insect predators such as dragonfly and damselfly larvae present, or a puddle may dry up before larval development can be completed). In other situations, there are treatment restrictions to be observed in order to avoid harm to non-target organisms, especially in environmentally-sensitive areas such as freshwater wetlands. Several treatment options either have restrictions on the label or on the NYSDEC permits, when fish are present. NYSDEC has issued permits for each aspect of the mosquito control program specifying in detail what may be done, when it may be done, and who may do it. All control measures must fully comply with these permits. Furthermore, all pesticides must be used in accordance with the product labels and all applicable pesticide laws. When treatment is necessary, there are a number of options available such as:

Introduction of Fish

Many saltwater fish eat mosquito larvae. Killifish are present in large numbers in the bays and in the south shore ditches. Several varieties of small top-feeding freshwater fish, including Gambusia, have been introduced to some storm water recharge basins that hold water year-round.

Figure 16
This storm water recharge basin is filled with many kinds of fish which feed on all stages of the mosquitoes

In addition to the fresh-water mosquitoes, there are several species of mosquitoes that inhabit the extensive saltwater wetlands on both the north and south shores of Nassau County. To reduce salt marsh mosquito populations, approximately 1000 miles of ditches were dug in the past years of which 700 miles were reconditioned since 1977, to improve drainage along the shoreline, on the south shore barrier islands, and among the numerous hassocks and islets. This reduces the size and number of puddles and areas of standing water suitable for mosquito egg hatching and larval development. In 1997, DPW hired additional personnel and acquired new equipment to maintain and recondition the drainage ditches, and to cut access paths that facilitate inspection, maintenance and treatment of mosquito breeding areas. Natural forces such as wind, rain, tides, and major storms continually influence the marsh topography, resulting in new and altered mosquito breeding areas; therefore ditch maintenance is an ongoing and long-term project. Well-maintained drainage ditches provide a habitat for killifish that feed on mosquito larvae, facilitate tidal water movement, and also create a suitable environment for waterfowl.

Figure 17
This floodwater ditch, filled with sand and debris is in need of maintenance, to prevent mosquito breeding

Figure 18
DPW “Ditcher” reconditioning ditches on South Shore

Figure 19
This ditch is well maintained, allowing tidal flows to move in and out, enabling killifish to swim in and eat the mosquito larvae

Elimination of Standing Water

Mosquito larvae are often found in clogged roof gutters, old tires, boat covers, swimming pools, swimming pool covers and other artificial containers. Swimming pools themselves, when properly maintained or periodically chlorinated, are not a problem. During complaint inspections property owners were advised of conditions conducive to larval development of mosquitoes. The Mosquito Control pamphlet given out during complaint inspections (attached) emphasizes the need for eliminating these localized breeding situations.

Figure 20
Swimming pool cover with stagnant water and leaves

Figure 21
Rain gutter clogged with leaves and standing water

Figure 22
Tire with stagnant water inside

Figure 23
Pile of used tires with the potential to breed mosquitoes

Hand Treatment with Larvicides

Four larvicides that may be used:

1. BTI (*Bacillus thuringiensis var. israeliensis*) is a naturally occurring soil bacterium that is eaten by the larvae, infecting them, and killing them. It is available in granular form or in a donut shaped briquette. It is very target specific, but will not work against the pupae stage, as pupae do not eat.
2. Vectolex CG (*Bacillus sphaericus*) is also a naturally occurring bacterium that infects mosquito larvae. It persists well in the organic rich environments favored by the *Culex* species of mosquitoes. It also is ineffective against pupae.

3. Altosid (Methoprene) is an insect growth regulator that prevents mosquito larvae from changing into adults. It is sometimes called a juvenile hormone. It is used in a briquette form for hand treating SWB's and other sites requiring long acting control (30 days).
4. Agnique is a non-toxic larvicide which spreads an invisible mononuclear film over the water, reducing the surface tension, making it difficult for larvae and pupae to attach. The film also blocks the breathing tubes of the larvae and pupae and they drown.

Aerial Spraying of Larvicides

DPW has a contract with a private company for aerial larvicide spraying by helicopter. The helicopter is able to spray large non-populated, inaccessible areas with a suitable larvicide, usually a liquid formulation of Altosid. Areas sprayed include the marshy areas of Jones Beach, Lido Beach, and a number of islets and hassocks on the south shore of Nassau County. Decisions as to when and where to treat are based upon the salt marsh surveys, tidal conditions, and boat surveys. The helicopter has been a very effective control measure and will continue to be used in the future. The helicopter was used 17 times in 2003.

Figure 24
Helicopter taking off to apply larvicides to unpopulated inaccessible areas of the south shore

Adulticiding

Adult mosquitoes are sensitive to a number of contact pesticides. The adulticide of choice for mosquitoes is a product named Scourge (Resmethrin 4.14% and Piperonyl butoxide 2.42%) which may be sprayed by an Ultra Low Volume generator mounted on the back of a pickup truck. Driven at a constant 5 mph rate, this method can treat large areas on either side of a roadway. Spraying must be done at times of low wind, usually early morning or late afternoon, to minimize drift. Adulticiding is only done when unacceptably high numbers of adults are present, disease is detected, or other means of control are ineffective

Aerial spraying of adulticide was done for the first time in 1999 in response to the initial West Nile threat. Anvil (Sumethrin) was used because it was considered the least toxic of the aerial adulticides. There has been no aerial spraying of any adulticides since that year.

Table 1
Pesticides That May Be Used by the Nassau County Mosquito Control Program

Product	Target	Application Method	Active Ingredient
Agnique	Mosquito Larvae	Hand Held Sprayer	Alchohol Ethoxylate
Altosid Liquid	Mosquito Larvae	Helicopter	Methoprene
Altosid Briquettes	Mosquito Larvae	Hand	Methoprene
Vecto Bac CG	Mosquito Larvae	Helicopter, Hand	BTI
VectoBac 12 AS	Mosquito Larvae	Helicopter	BTI
Bactimos Briquettes	Mosquito Larvae	Hand	BTI
VectoLex CG	Mosquito Larvae	Backpack Blower, Hand	BS
Scourge	Adult Mosquitoes	Truck Mounted Sprayer	Resmethrin, Piperonyl Butoxide
Anvil	Adult Mosquitoes	Helicopter	Sumithrin, Piperonyl Butoxide

Pesticide Training and Certification

NYSDEC requires that anyone applying pesticides be certified and receive continuing education in safe pesticide storage, handling, and treatment practices. Therefore, personnel in the mosquito program must take a 30 hour course, pass the state test for certification in Category VIII (Public Health), and then attend continuing education training sessions. Nassau County is fortunate that DPW Mosquito Control has a certified Pesticide Applicator Trainer to instruct other County personnel

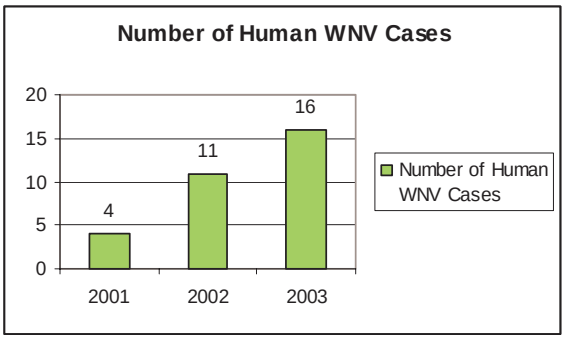
Figure 25
Above are some of the many headlines and newspaper articles regarding WNV

Table 2
Comparative Mosquito Program Statistics

	Year 2001	Year 2002	Year 2003
Number of General Mosquito Complaints	788	923	873
Number of Inquiries (tel con only)	3,171	2,755	4,039
Number of Bird Reports (birds other than crows)*	3,456	4,118	877
Number of Crow Reports *	1,351	849	384
Number of Birds Sent to NYS for Testing (by NCDH)	99	36	37
Number of Positive Birds (from all sources)	50	14	22
Number of Negative Birds (from all sources)	49	31	29
Number of Positive Mammals	4	0	0
# of CDC Mosquito Light Traps Set (Trapnights)	1,590	942	703
Total CDC Female Mosquito Catch	36,918	21,442	31,113
CDC Trapnight Avg for Female Mosquitoes	23	23	44
# Gravid Traps Set (Trapnights)	229	162	95
Total Gravid Trap Female Mosquito Catch	743	4,437	3,612
Gravid Trap Trapnight Average for Female Mosquitoes	3	27	38
# Faye - Prince Traps Set	0	24	12
Total Faye - Prince Trap Female Mosquito Catch	0	172	66
Faye - Prince Trap Trapnight Average for Female Mosquitoes	0	7	6
Total # of All Mosquitoes Trapped (CDC, Gravid,& Faye)	37,661	26,051	34,791
Number of Mosquito Pools Sent to NYS for Testing	613	591	596
# of Blooded Mosquito Pools sent to Cornell for Testing	125	0	0
Number of Positive Mosquito Pools	27	38	29
Number of PCR Negative Pools (NYSDOH Lab)	595	551	567
Number of Larvae Breeding Sites Dipped	3,749	3,710	4,098
Number of Larvae Dipping Sites Positive for Larvae	1,193	1,289	1,549
Number of Areas Larvicided by Hand	1,462	1,420	1,576
Number of Helicopter Treatments with Larvicide	19	18	17
Number of Areas Adulticided by Truck or Backpack	0	1	0
Number of Human Cases	4	11	17

Graphs 7 - 14
Fluctuations and Trends Comparing Various Parameters
Comprising the Nassau County WNV Surveillance and Control Program

7



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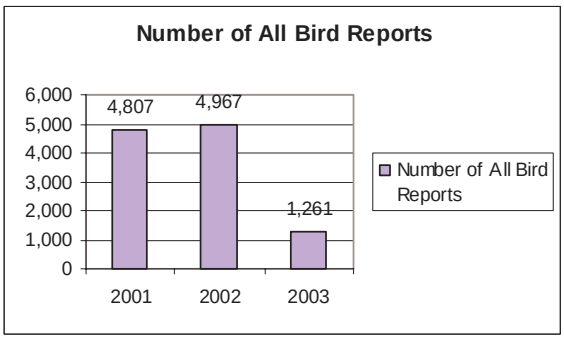

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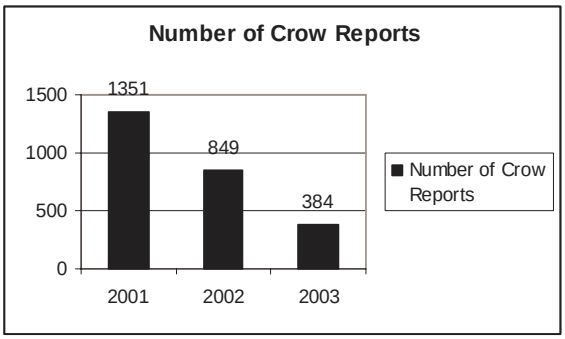

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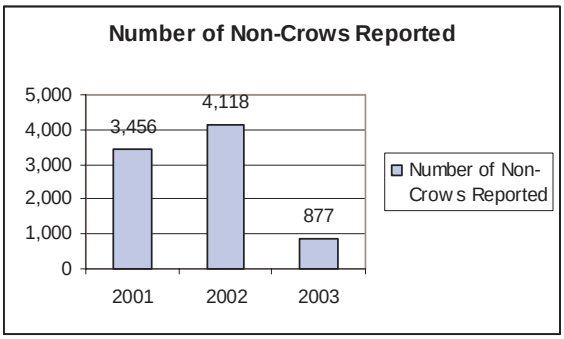

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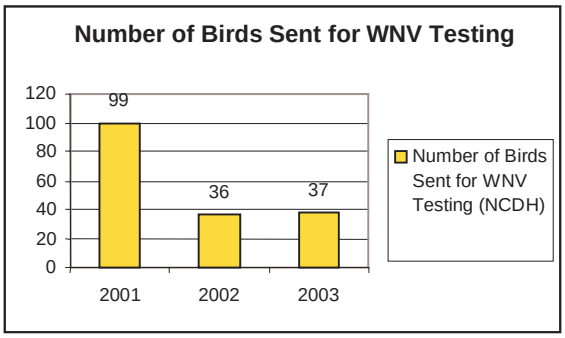

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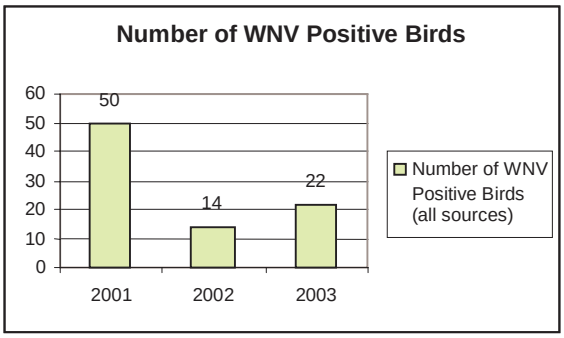

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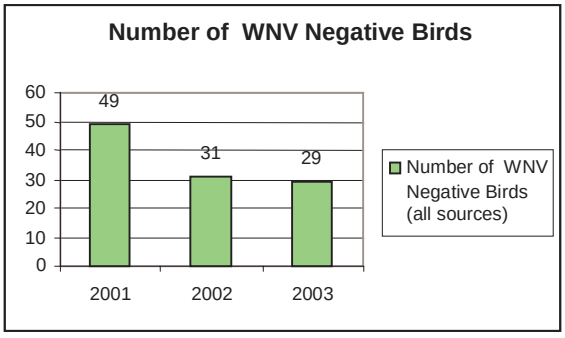

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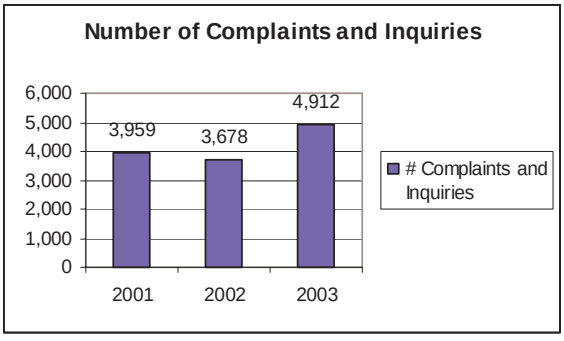
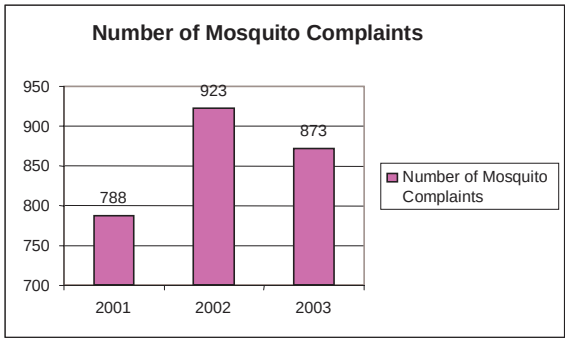


Graphs 15 - 22
Fluctuations and Trends Comparing Various Parameters
Comprising the Nassau County WNV Surveillance and Control Program

15



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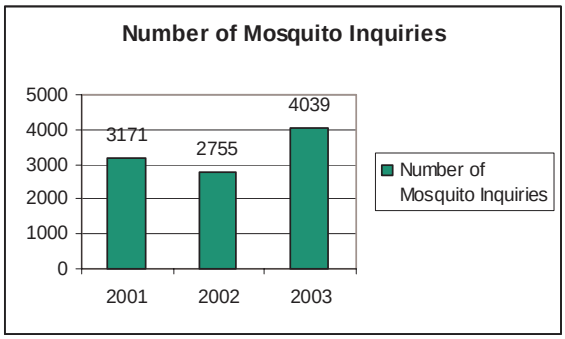

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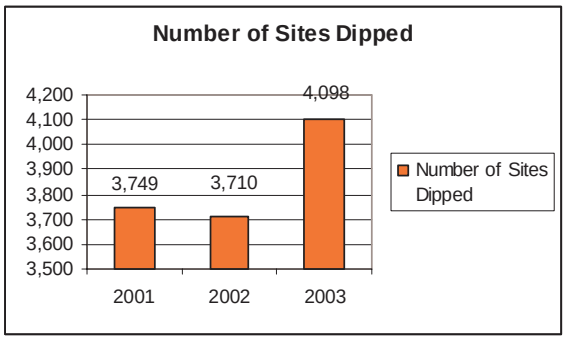

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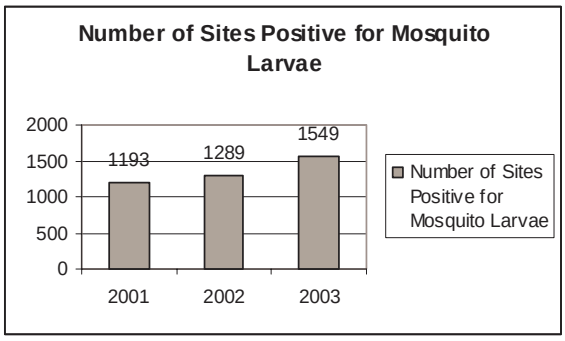

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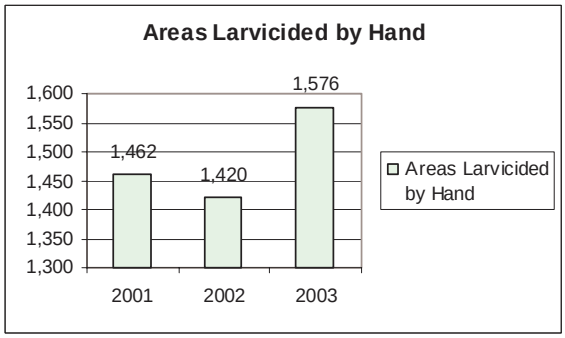

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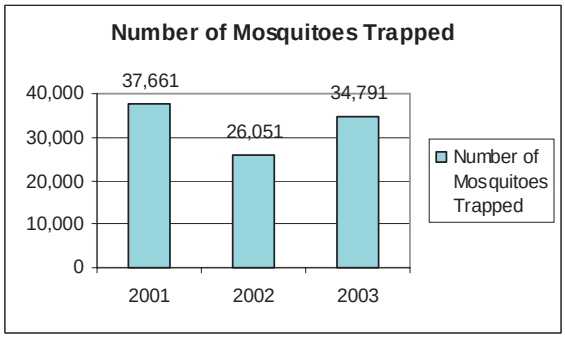

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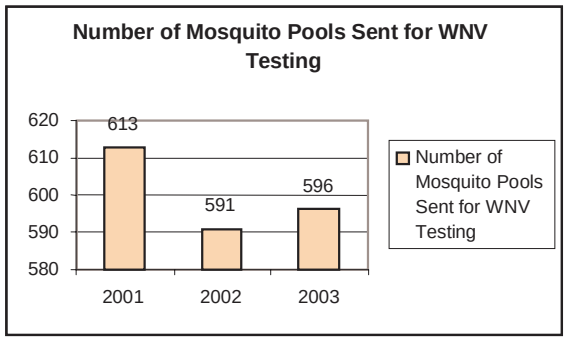

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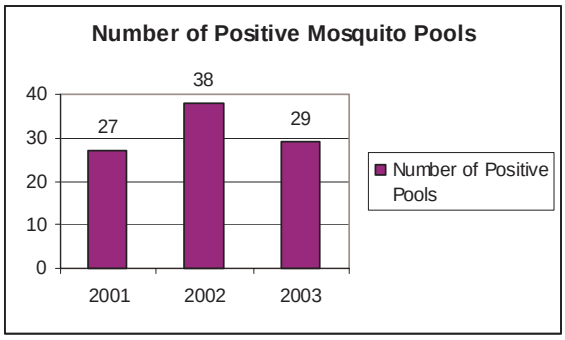

Table 3
Nassau County Cumulative Summary of Mosquitoes Captured in CDC Light Traps
as of December 31, 2003

Site Name	Site #	Trap Night Avg	# Trap Nights	Mosquitoes Trapped / Genus and Species														
				Oc can	*Oc ctt*	*Oc jap*	*Oc sol*	*Oc tri*	*Oc tvt*	*Ae vex*	*An pun*	*An qua*	*Cq per*	*Cx pre*	*Cx sal*	*Ps fr*	Other	Totals
Woodmere Club	F3317	36.7	15		202		5		5	23	1			252			62	550
swb 199 Valley Stream	E2649	24.4	19		1				20	228	5	1	2	133			46	464
Belm Race, Elmont	E2338	60.7	15		1		2	1	4	182	7			588			107	910
swb 66 W. Hempst	J2537	22.8	18					3	21	133	7	2		184		2	34	411
Hemp LkPk, Lakev	K2738	32.6	14	13	3			5	4	49	32	9	2	285	4	3	26	456
swb 471, Roosevelt	R2626	22.8	16		1		1	34	46	116	8	2		118			30	364
swb 85 East Meadow	V2417	16.3	18						23	74	5			143		1	32	294
swb 234, Hicks	W1839	30.8	16				1	4	56	84	5	1		282			37	492
swb 412, Hicks	Y2036	20.8	17						35	130	10			155			16	354
swb 86 Farmingdale	CC2126	39.8	15		2			3	146	93	7	3		244		1	65	597
Bethpage State Park	CC1948	32.3	18	45		1		4	88	133	2	1		207		8	83	582
swb 469, Glen Cove	M0829	24.4	17		3	4	1	20	20	119	1	6		170		4	66	414
swb 337, Glen Cove	Q0716	15.7	19		3			5	28	54	2	7		153	1	8	34	298
MilNkPres, Bayvll	R0228	61.7	18		761		9		27	32	1	1		118	1		147	1110
Plntng Field Arb Oys Bay	T0639	23.8	17		8		1	11	20	76	8	6		231			35	405
swb 534,Oy Bay C	Y0738	112.8	17	2	3			5	469	306	12	24	7	800	2	46	223	1918
swb 123, Gardn City	K2136	8.4	13				1	1	4	10	1			84			8	109
swb 82, Mineola	L1946	28.3	11	1				6	159	55	1	1		55		3	30	311
swb 143, E. Hills	N1536	21.1	10					1	26	42	2	1	1	112			26	211
Old W Grdns Old Westbury	Q1637	19.5	11			1		19	34	32	5	12		69		7	36	215
swb 315, Westbury	R1948	48.9	12						70	96	7			376	4		34	587
swb 540, E. Gardn C	P2216	74.1	11				2		7	244	3			496		1	62	815
Meadow Is,Pt Lookout	T3428	190.5	14		18		134		49	1035	1	3		1162	37	1	227	2667
Nssa Bch, Lido Bch	Q3726	57.1	19				42		7	390				528	3		114	1084
LBSTP, Long Bch	K3629	2.8	24	1						1				60	1		3	66
Bay Park Golf Course	J3248	9.2	22		2		4		4	34				136	5		18	203
Baldw Hrbr Pk, Bald	P3227	21.1	19		2		28		42	73				225	7	3	21	401
Bab Tpk, Merrick	T2817	27.2	21				3	4	60	243	8	2		132	17	10	93	572
E Ponds, Tobay Beach	CC3319	393.3	14		1036		855		9	1057	2		1	1951	25		570	5506
swb 173, Want	Y2547	24.6	17		8		4		31	158	4			182			32	419
Mass Preserve	BB2647	55.6	18	410	3			24	216	139	8	10		101		12	78	1001
swb300 Massap Park	EE2519	69.6	16		8	1	5	2	157	349	4	3	1	431			152	1113
swb 536, Jericho	V1427	6.1	19	1			1	2	22	31	3	6		41			8	115
swb 372, Plainv	DD1519	107.5	16		2		1	13	998	410	2	1		80		6	207	1720
swb 306, Woodbry	CC1139	30.6	17				1		158	183	1	5	3	101		7	62	521
Mut Pre, E Norwch	V0929	23.4	15	42		1		5	123	55	5	6	7	47		24	36	351
CW Post, Greenvle	Q1138	35.3	16					5	268	144	5	5		51		8	78	564
swb 466, Searingtn	K1717	32.7	15					2	65	110	7	5		251	3	3	44	490
Snds Pt Pre, Snds Pt	F0738	46.3	18		8	1	0	45	42	334	15	16	2	207	1		162	833
Stny Rd, Plan Manr	G1336	41.7	16	62				159	33	119	10			163		12	109	667
Alkers W, Kings Pt	C1247	24.1	17	19	15			15	15	32	4	1		253	10		46	410
swb 91 Lake Success	F1836	33.2	17	6			2		34	130	8	14	1	301		3	65	564
swb 178, Hicksville	LC	12.75	4						1	11	2	1		32		0	4	51
Westsidesob135,Bethpage	JC	8.6	5						1	20	2	0		16			4	43
Inwood CC, Inwood		17	3				13			4		7		7			2	51
WS Wntgh Pky, New Cas	T1717	21.25	4			2		35	6	19				18		1	4	85
Totals		44.3	703	602	2090	11	1116	433	3653	7392	223	162	27	11731	121	174	3378	31113

Table 4

Summary of the Number of Female Mosquitoes

Trapped by Species in 2003

Species	Number	Percent
Culex pipiens/restuans (Cx pre)	14,791	42.51%
Aedes vexans (Ae vex)	7,404	21.28%
Ochlerotatus trivittatus (Oc tvt)	3,668	10.54%
Aedes cantator (Ae ctt)	2,102	6.04%
Ochlerotatus sollicitans (Oc sol)	1,117	3.21%
Aedes canadensis (Ae can)	602	1.73%
Ochlerotatus triseriatus (Oc tri)	453	1.30%
Anopheles punctipennis (An pun)	225	0.65%
Psorophora ferox (Ps fer)	180	0.52%
Anopheles quadrimaculatus (An qua)	165	0.47%
Culex salinarius (Cx sal)	121	0.35%
Aedes cinereus (Ae cin)	38	0.11%
Coquillettidia perturbans (Cq per)	27	0.08%
Uranotaenia sapphirina (Ur sap)	15	0.04%
Ochlerotatus japonicus (Oc jap)	11	0.03%
Culex territans (Cx ter)	6	0.02%
Anopheles crucians (An cru)	3	0.01%
Aedes taeniorhynchus (Ae tae)	2	0.01%
Culiseta inornata (Cs ino)	1	0.00%
Orthopodmyia signifera (Or sig)	1	0.00%
Culiseta melanura (Cs mel)	0	0.00%
Ochlerotatus intrudens (Oc int)	0	0.00%
Aedes dorsalis (Ae dor)	0	0.00%
Psorophora confinnis (Ps con)	0	0.00%
Aedes grossbecki (Ae gro)	0	0.00%
Aedes excrucians (Ae exc)	0	0.00%
Unidentifiable	3855	11.1%
Total Female Mosquitoes	34,791	100%
Total Trapnights	810	
Mosquitoes per Trapnight	43.0	
Total Different Species	22	

Note –the mosquitoes represented on this chart were captured by CDC, Gravid, and Faye-Prince Traps

Table 5
Summary of Positive Mosquitoes Captured in Nassau County in 2003

#	Date Mosquito Collected	Type	Where Collected	ID#
1	July 31, 2003	Culex - pipiens/restuans	Bayville	03290309-059
2	August 13, 2003	Culex - pipiens/restuans	East Meadow	03290383-059
3	August 13, 2003	Culex - pipiens/restuans	Farmingdale	03290384-059
4	August 15, 2003	Culex - pipiens/restuans	Old Westbury	03290363-059
5	August 15, 2003	Culex - pipiens/restuans	East Garden City	03290375-059
6	August 15, 2003	Culex - pipiens/restuans	East Garden City	03290377-059
7	August 15, 2003	Culex - pipiens/restuans	East Garden City	03290376-059
8	August 21, 2003	Culex - pipiens/restuans	Woodbury	03290424-059
9	August 22, 2003	Culex - pipiens/restuans	Kings Point	03290388-059
10	August 22, 2003	Culex - pipiens/restuans	Searingtown	03290431-059
11	August 22, 2003	Culex - pipiens/restuans	Lake Success	03290434-059
12	August 27, 2003	Culex - pipiens/restuans	Hicksville	03290456-059
13	August 27, 2003	Culex - pipiens/restuans	East Garden City	03290473-059
14	August 27, 2003	Culex - pipiens/restuans	Farmingdale	03290480-059
15	August 27, 2003	Culex - pipiens/restuans	Farmingdale	03290481-059
16	September 4, 2003	Culex - pipiens/restuans	Hicksville	03290497-059
17	September 4, 2003	Culex - pipiens/restuans	Massapequa Park	03290501-059
18	September 5, 2003	Culex - pipiens/restuans	Lake Success	03290519-059
19	September 5, 2003	Culex - pipiens/restuans	Lake Success	03290511-059
20	September 12, 2003	Culex - pipiens/restuans	East Garden City	03290540-059
21	September16, 2003	Culex - pipiens/restuans	Elmont	03290548-059
22	September 16, 2003	Culex - pipiens/restuans	Valley Stream	03290553-059
23	September 17, 2003	Culex - pipiens/restuans	Hicksville	03290555-059
24	September 17, 2003	Culex - pipiens/restuans	East Meadow	03290557-059
25	September 17, 2003	Culex - pipiens/restuans	Hicksville	03290554-059
26	September 17, 2003	Culex - pipiens/restuans	East Meadow	03290558-059
27	September 17, 2003	Culex - pipiens/restuans	Farmingdale	03290561-059
28	September 25, 2003	Culex - pipiens/restuans	Massapequa Park	03290573-059
29	October 15, 2003	Culex - pipiens/restuans	Woodbury	03290592-059

The chart above lists the positive mosquito pools and where they were captured in 2003

Table 6

Birds Found Positive with West Nile Virus

2003

	Date Bird Collected	Type Bird	Where Collected	Accession #
1	July 23, 2003	Crow	Levittown	03001493
2	July 31, 2003	Crow	Freeport	03001688
3	August 5, 2003	Crow	Freeport	03001739
4	August 5, 2003	Crow	Plainedge	03001716
5	August 5, 2003	Crow	Glen Cove	03001774
6	August 6, 2003	Crow	Levittown	03001775
7	August 8, 2003	Crow	Hempstead	03001816
8	August 14, 2003	Crow	Bayville	03002080
9	August 17, 2003	Crow	Old Brookville	03002034
10	August 18, 2003	Crow	Inwood	03002070
11	August 18, 2002	Crow	W. Hempstead	03002067
12	August 21, 2002	Blue Jay	Merrick	03002191
13	August 22, 2002	Red Tailed Hawk	Glen Cove	03002829
14	August 26, 2003	Blue Jay	Jericho	03002268
15	August 26, 2003	Crow	Brookville	03002465
16	September 2, 2003	Crow	Oyster Bay	03002559
17	September 2, 2003	Crow	Massapequa	03002543
18	September 3, 2003	Crow	Wantagh	03002577
19	September 6, 2003*	Society Finch	Woodmere	03002707
20	September 9, 2003	Crow	Rockville Centre	03003485
21	Septmeber 17, 2003*	Golden Finch	Woodmere	03002832
22	October 9, 2003	Blue Jay	Malverne	03003263

* bird collected/submitted by person or agency other than NCDH

Nassau County Mosquito Surveillance and Control Plan for 2004

Nassau County DPW and NCDH believe that our past efforts have been effective and plan to continue the implementation of our West Nile Response Plan in 2004. Together, with the cooperation of local, state, and federal agencies, we hope to minimize the risk of WNV to humans and animals, and at the same time protect our environment. Our plan is outlined below.

I. Planning

Six workgroups with members from NYS, NYC, and other involved counties plan to hold teleconferences to define objectives, goals, and methods to be used to respond to the West Nile virus threat.

1. Human Surveillance
2. Bird Surveillance
3. Mosquito Surveillance
4. Prevention/Response/Control
5. Data Coordination
6. Public Information

II. Public Awareness

Continue developing a proactive awareness campaign, to reach:

1. Residents
2. Day care centers
3. Senior citizens
4. Environmental groups
5. Hospitals, etc.

Continue developing pamphlets, reports, press releases, TV spots, etc., to inform the public about how they can prevent mosquito breeding in their own back yards, and protect themselves and their families.

III. Mosquito Surveillance

Maintain surveillance efforts which includes:

a. Dipping for larvae throughout the year
b. Identify and operate effective trap sites (approximately 42/week, May-October)

IV. Tracking – Human and Wildlife

a. Dead bird and mammal reports
b. Human case reports
c. Complaints/inquiries

V. Laboratory Analysis

Arrange with NCDH and NYS Labs to receive, identify, handle, and ship mosquito, bird, and blood samples.

VI. Control Strategies

a. Identify sensitive areas (to avoid chemical treatment)
b. Removal of mosquito breeding habitats (private and public)
c. Larvicides (bacteria and insect growth regulators)
d. Adulticides (chemical spraying only as a last resort)

COUNTY EXECUTIVE

Thomas R. Suozzi

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